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(54) An emergency release device for a safety belt

(57) An emergency release device for a safety belt is secured near the door of a vehicle so that a rescuer may have ready access thereto in case of an accident. An anchor lug (1) is fixed by a screw (2) to the door post (3) of the vehicle. A releasable lug (4) receives the strap (6) of the safety belt. In case of emergency, the push button (7) is depressed which disengages latching pin

(10) from a hole of complementary mating configuration in the anchor lug (1) thereby freeing the release lug (4). The oblique traction force exerted by the strap (6) on the releasable lug (4) then automatically frees the releasable lug (4) from the anchor lug (1). The latching pin (10) is normally urged to its latching position by a leaf spring member (12) the resilient force of which is overcome by depressing the push button (7).

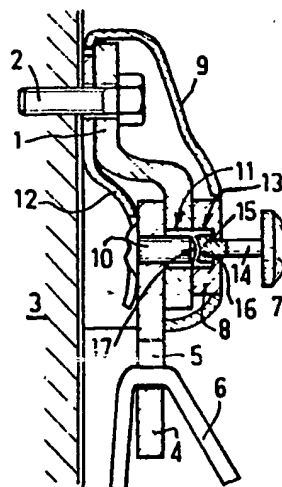


FIG.2

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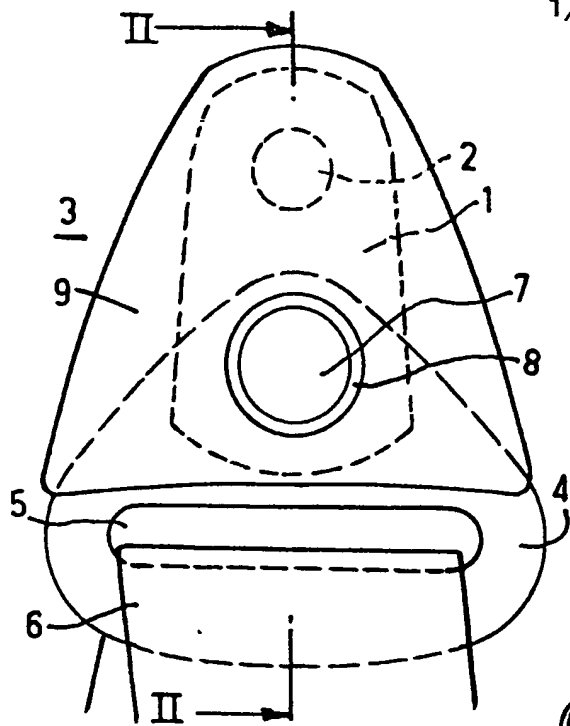


FIG. 1

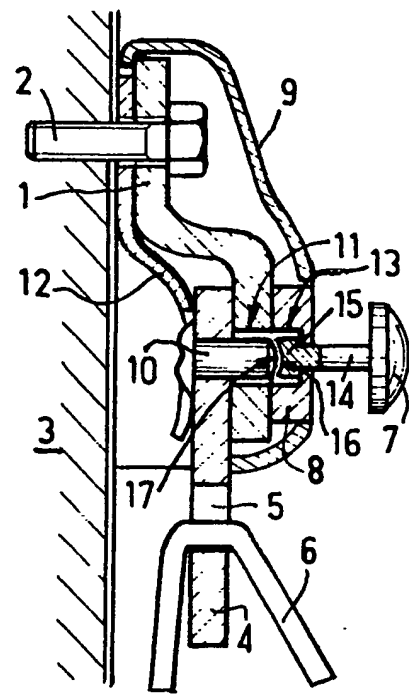


FIG. 2

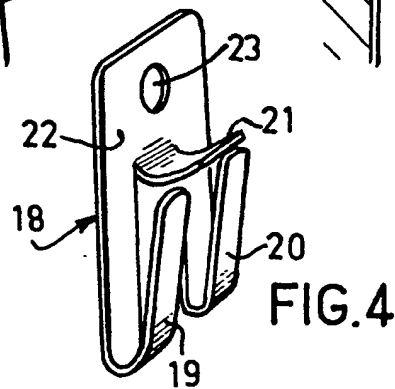


FIG. 4

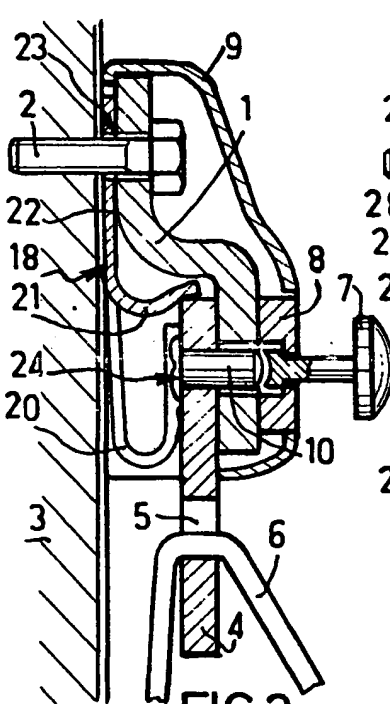


FIG. 3

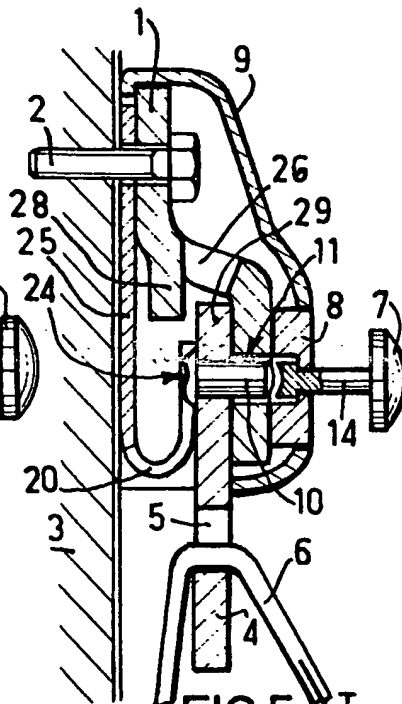


FIG. 5

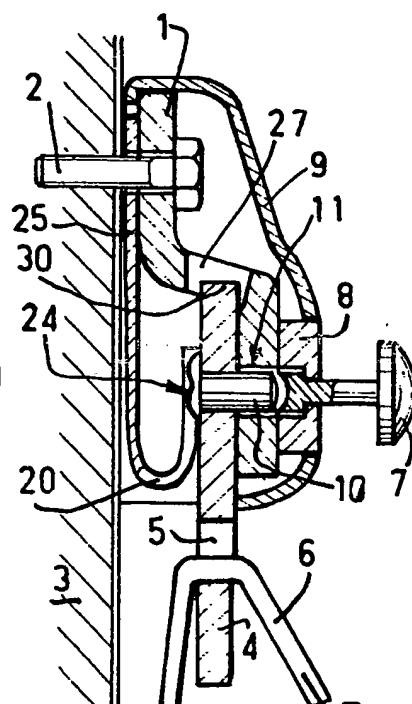


FIG. 6

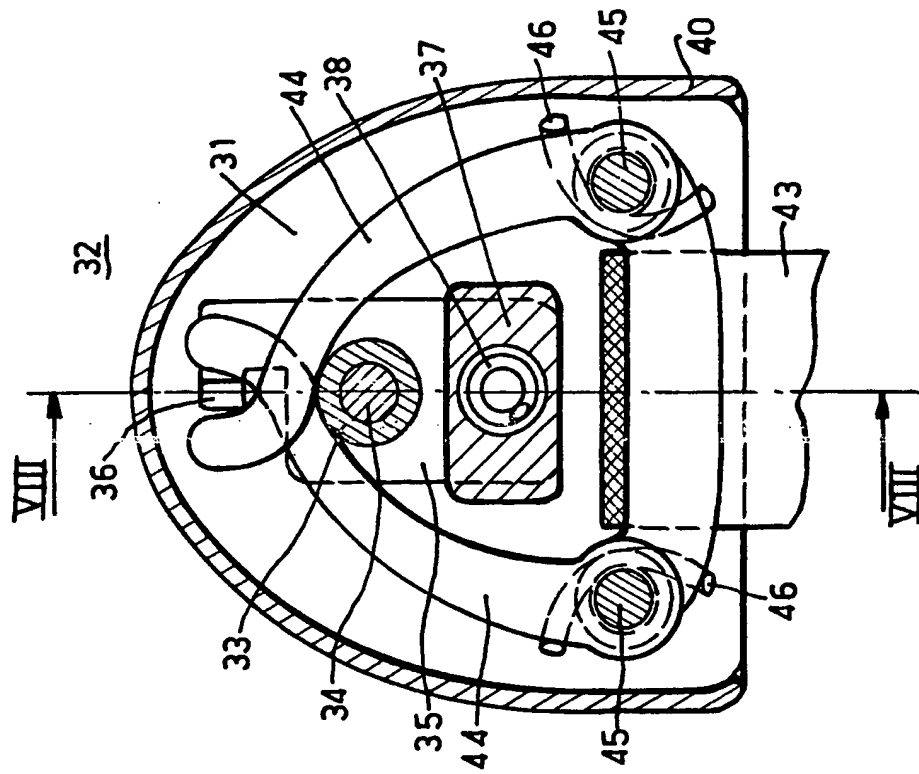


FIG. 7

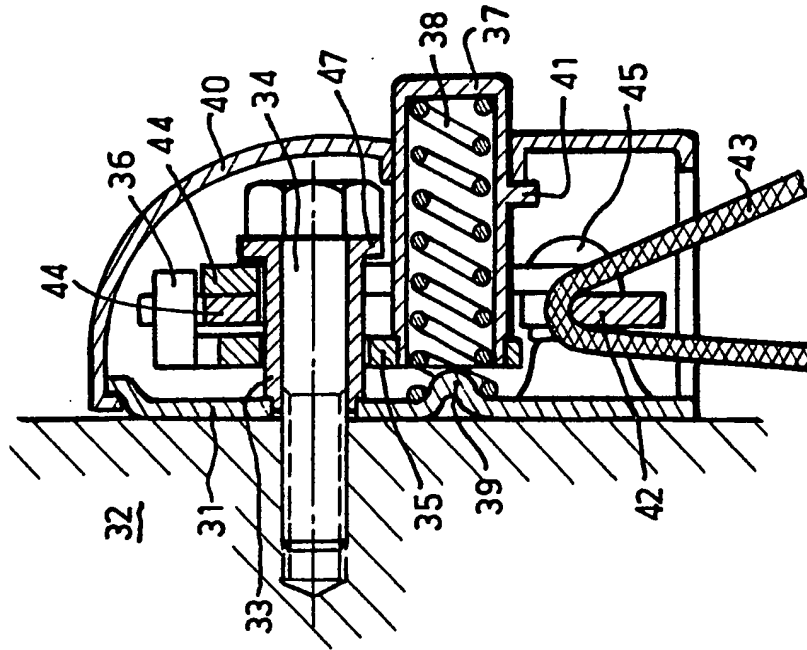


FIG. 8

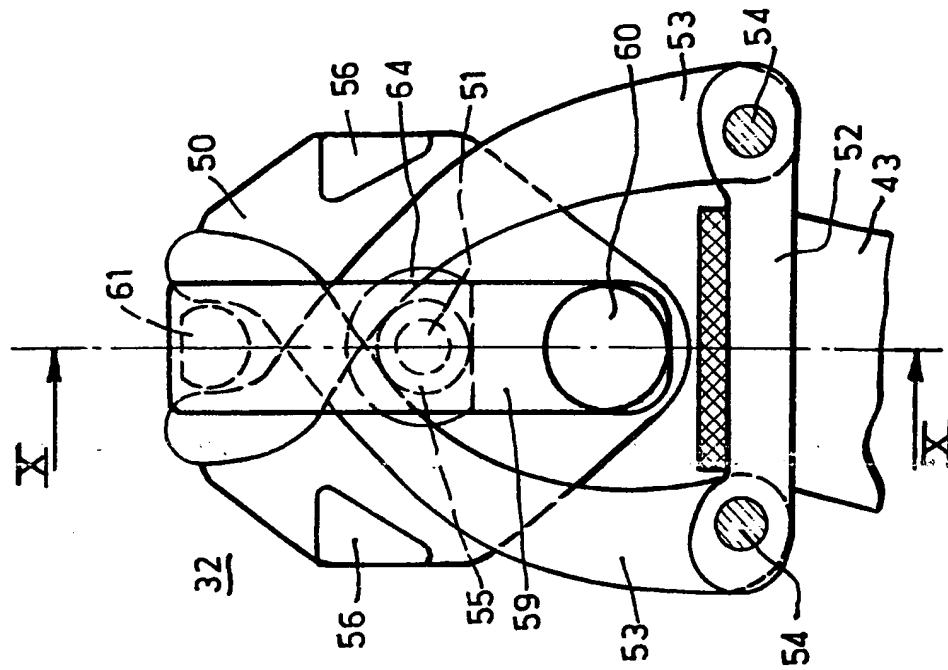


FIG. 9

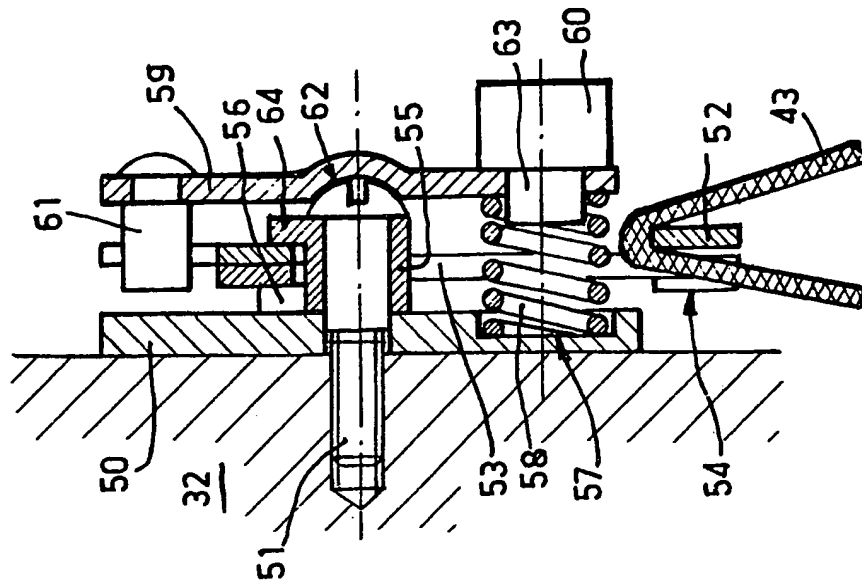


FIG. 10

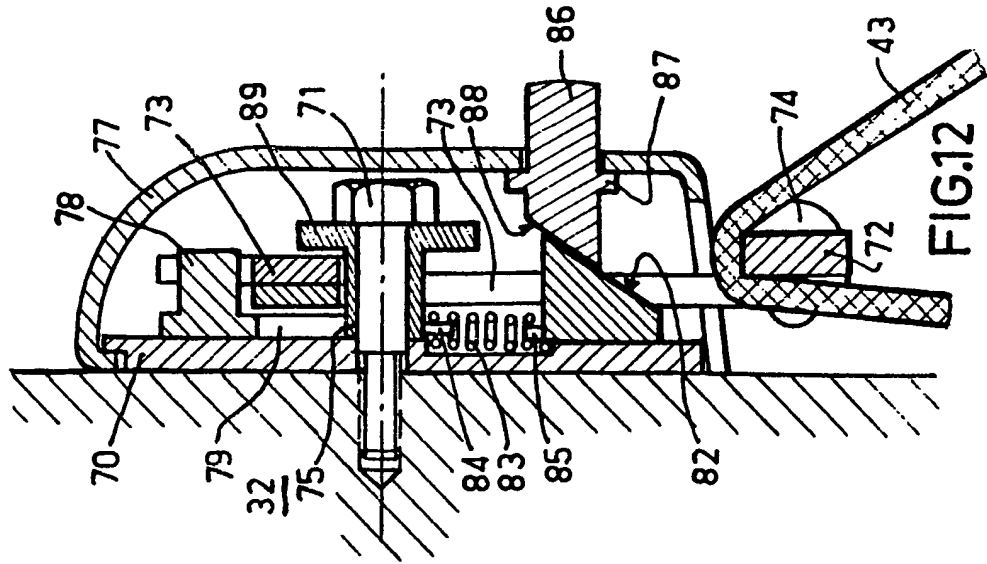


FIG.12

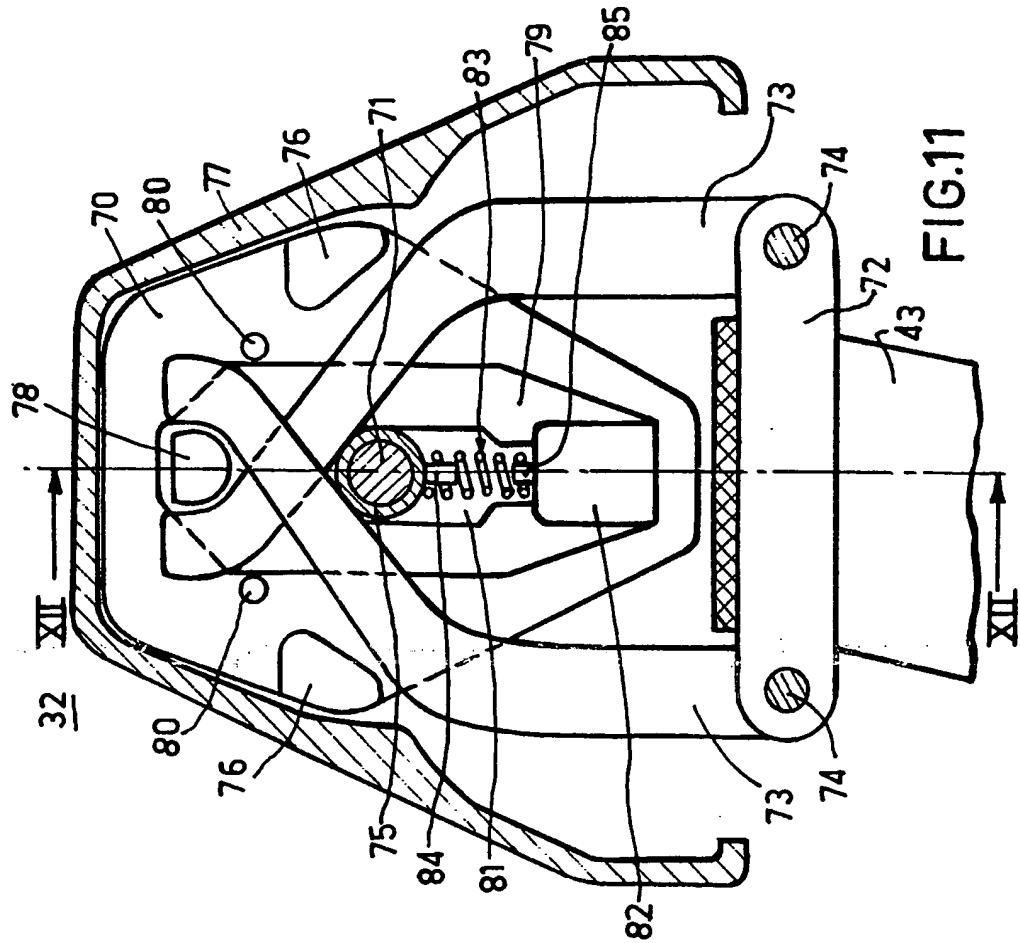


FIG.11

SPECIFICATION

Emergency release device for a safety belt

5 The present invention relates to an emergency release device for a safety belt or seat belt.

Known safety belts can only be released by means of a single buckle situated near the center of vehicles on which they are fitted. In case of accident if the
10 buckle is jammed or damaged or made inaccessible by the body of an injured driver or passenger, he or she may not be timely removed especially in case the vehicle has caught on fire or is sinking in water. An emergency safety device for quickly freeing the
15 seat belt is therefore indispensable, which device must be of easy access for rescuers and therefore preferably located near the doors, for example on the side posts of the body of the vehicle.

Further, in order not to waste valuable time the
20 device should be easily located and of simple operation, this simple operation also ensuring rugged mechanical construction and lost cost price.

An object of the invention is therefore to provide an emergency release device combining all the
25 above-mentioned features which is also adapted to be equipped to any kind of vehicle without necessitating any special transformations and which may, optionally, be mounted on pre-existing seat belt without altering the same.

30 According to the invention, there is provided an improved emergency release device for a safety belt strap comprising an anchor lug adapted to be fixed to a vehicle, a releasable lug adapted to be attached to the strap, means for latching the lugs together by
35 engagement of portions of mating configuration, resilient means urging the portions of mating configuration into mating engagement, and a release member for releasing the releasable lug carried by the anchor lug and resiliently urged to a rest
40 position.

According to a first preferred embodiment, the latching means comprises a projecting portion carried by the releasable lug and received in a corresponding hole of mating configuration formed in the
45 anchor lug, the projecting portion may be a pin and the hole a through hole traversing the anchor lug while, preferably, the release member is a push button disposed forwardly of the hole in the anchor lug and adapted to push the pin endwise.

50 According to another preferred embodiment, the latching means comprises a stop member fixed to and protruding from one of the lugs, two coupling fingers fixed to the other lug so as to enable their ends to cross and secure the strap to the stop
55 member by embracing the latter, and a latching member adapted to be inserted between the ends of the coupling fingers when they are crossed.

The invention will now be described in greater detail with reference to preferred embodiments
60 given by way of illustrative examples and shown in the accompanying drawings, in which:

Figure 1 shows a front view of an emergency release device according to a first embodiment;

Figure 2 shows a sectional view taken on line II-II
65 in figure 1;

Figure 3 shows a first alternative embodiment of the emergency release device;

Figure 4 is a perspective view of the spring employed in the alternative embodiment of figure 3;

70 *Figure 5* shows a second alternative embodiment of the emergency release device;

Figure 6 shows a third alternative embodiment of the emergency release device;

75 *Figure 7* is a front view of a fourth alternative embodiment of the emergency release device with the front part or cover removed so as to better perceive the internal mechanism;

Figure 8 shows a sectional view of the emergency release device of figure 7 taken on line VIII-VIII
80 therein;

Figure 9 is a front view of a fifth alternative embodiment of the emergency release device with the cover removed;

85 *Figure 10* is a sectional view of the emergency release device of figure 9 taken on line X-X therein;

Figure 11 is a front view of a sixth alternative embodiment of the emergency release device; and

Figure 12 is a sectional view of the embodiment of figure 11 taken on line XII-XII therein.

90 As illustrated in figure 1, the emergency release device comprises an anchor lug 1 fixed by a screw 2 to the side or door post 3 of a motor vehicle body; the anchor lug 1 supports a releasable lug 4 comprising a slot 5 through which the strap 6 of the
95 safety belt or seat belt may slide. In case of emergency, the releasable lug 4 may be released by depressing a push button 7 mounted at the end of a plunger 14 the other end of which is accommodated inside a cage 8 fixed, e.g. welded, to the anchor lug
100 1. A cover 9 snaps on the anchor lug 1 and encloses the mechanism.

In figure 2, which is a sectional view taken on line II-II of figure 1, is visible the manner of latching the releasable lug 4 to the anchor lug 1 which is affected
105 by means of a pin 10 crimped on the releasable lug 4 perpendicular to the same and engageable in a hole 11 traversing the anchor lug 1. A leaf spring member 12 is fixed on the side post 3 by screw 2 and the anchor lug 1 which presses it against the post. The leaf spring member 12 bears against the releasable
110 lug 4 on the side remote from the latching pin 10 in such a manner that the pin is held resiliently engaged in the corresponding hole 11 in the anchor lug 1. The cage 8 which is arc-welded to the anchor
115 lug 1 comprises a cavity 13 which opens in registry with hole 11 and accommodates an end of the plunger 14 the other end of which carries the push button 7, the plunger 14 passing through the wall of the cage 8 through a bore 16 in which the plunger is
120 slidable. The end of the plunger 14 accommodated in the cavity 13 of the cage 8 has an enlarged portion 15 the end face 16 of which, located opposite the end of the pin 10, is of concave part-spherical configuration, said end of the pin 10 itself having a complementary, convex part spherical end 17 so as to ensure axial alignment of the plunger 14 with pin 10 when they are in end-to-end engagement.

125 Preferably, the push button 7 is red in colour, red being universally acknowledged as indicating
130 emergency devices.

Various modifications may be contemplated namely in respect of the leaf spring member adapted to urge the releasable lug 4 against the anchor lug 1.

According to a first alternative embodiment of figures 3 and 4, the leaf spring member 18 comprises two upwardly curved hook-shaped side tabs 19 and 20 and a central tab 21 formed as a part of the leaf spring member 18 intermediate the side tabs 19 and 20, this central tab being raised substantially perpendicular to the base portion 22 of the leaf spring member 18 which has a fastening hole 23 adapted to receive a screw 2 for fixing the anchor lug 1 to the side post 3 of the vehicle body. When the leaf spring member 18 is in position and the latching pin 10 of the releasable lug 4 is engaged in its corresponding cavity formed in the anchor lug 1, the two side tabs 19 and 20 of the leaf spring member 18 bear against the back of the releasable lug 4 on each side of the crimped end 24 of the pin 10 so as not to interfere with downward disengaging displacement thereof. The end of the central tab 21 rests and bears resiliently downwards against the upper end of the releasable lug 4 so as to eject it when the pin 10 clears the hole 11 in the anchor lug 1.

Thus, in accordance with this first alternative embodiment, the leaf spring member 18 thus ensures a dual function; first it resiliently maintains the pin 10 in its hole 11 in the anchor lug, and second, on the contrary, expels the releasable lug when the pin 10 is ejected from its hole.

In the other two alternative embodiments illustrated in figures 5 and 6, the leaf spring member 25 is simplified and does not comprise a central, lug-expelling tab but only two side, retaining tabs 19 and 20. On the other hand, the anchor lug 1 is so modified that it counters the swinging of the releasable lug 4 due to the oblique traction force of the strap 6. Indeed, in order to preclude inadvertent release of the releasable lug 4 by the traction force of the strap, the anchor lug 1 comprises a strike 26 (figure 5) or a cutout 27 (figure 6). In the second alternative embodiment of figure 5, the tongue 28 struck from the anchor lug 1 is bent downwards to form an abutment behind the upper end 29 of the releasable lug 4. The releasable lug 4 thus abuts against it thereby precluding the disengagement of the pin 10 by the oblique traction force T exerted by the strap 6. Obviously the abutment formed by the tongue 28 is sufficiently spaced from the upper end 29 of the releasable lug 4 so as not to interfere with the ejection of the pin 10 from its hole 11 when the button 7 and associated plunger 14 are depressed, but it is close enough, however, to restrict the swinging of the releasable lug 4 in the opposite direction and prevent the inadvertent or accidental ejection of the pin 10.

The emergency release device according to the third alternative embodiment of figure 6 produces the same result but with different means; the anchor lug 1 is also punched out at 27 but does not form a downwardly bent tongue, the rear retention of the releasable lug 4 being accomplished by the upper end thereof which comprises an upward extension 30 which is received in the cutout 27 in the anchor lug 1 and bears against the rear edge of the cutout

thereby restricting rearward swinging of the releasable lug 4 due to the oblique traction force T of the strap 6 and prevents the pin 10 from being ejected from the hole 11 therefor.

70 The operation of this embodiment is very simple and is readily comprehended from associated figure of the drawing.

In case of an accident and when quick release of driver's or passengers seat belt is called for, it suffices to depress the push button 7 in order to align the convex end 17 of the pin 10 on the concave end 16 of the push rod 14 and eject the pin 10 from its hole 11 in the anchor lug 1 by making the tab or tabs 12, 22 or 25 of the leaf spring member flex resiliently. The traction force exerted by the strap 6 by the body of a victim of an accident which leans against the strap, withdraws the releasable lug 4 and enables the victim to be quickly removed from the vehicle. The withdrawal of the releasable lug 4 is made even more expedient by the action of a resilient tab 21 (figure 3) which bears against the upper end of the releasable lug 4 and impedes any possible swinging or rocking of the rear end of the releasable lug 4 caused by the oblique traction force T of the strap 6 of the safety belt.

Conversely, it will be readily understood that the releasable lug 4 is easily attached to the anchor lug 1 simply by compressing the leaf spring member and pushing the releasable lug 4 upwards until the pin 10 comes into registry with the end of the hole 11 and enters the same under the force exerted by the leaf spring member.

Obviously the leaf spring member may be replaced by a coil spring or even by a rubber or other kind of elastic material, plug; likewise the protruding latching portion of the releasable lug 4 may comprise something other than the crimped pin 10, e.g., a finger or a punched and bent projection or bit.

The plunger 14 may also bear directly on the releasable lug 4 instead of bearing against the end of the pin 10, the bearing zone preferably being located below the pin in the alternative embodiment of figures 5 and 6 so as to rock the releasable lug 4 in a direction opposite that of the oblique traction force T of the strap 6. In fact the effect of the push rod 14 is to straighten the releasable lug and at the same time push the pin 10 out of its hole.

As illustrated in figures 7 and 8, the emergency release device according to a fourth alternative embodiment comprises an anchor lug 31 fixed to the body 32 of a vehicle by means of a locating sleeve 33 received on a screw 34. A latch member 35 is slidably mounted on the sleeve 33 and comprises a latching bit or member 36 protruding from its upper end and a push button 37 at its lower end. The push button 37 is hollow and accommodates a compression spring 38 positioned on the anchor lug 31 but a stamped boss 39 which penetrates axially into the spring. The push button 37 is retained against the force exerted by the spring 38 which tends to move it away from the anchor lug 31, by a cover 40 of sheet metal or plastic clipped on the anchor lug and provided with an aperture through which protrudes the free end of the push button 37. The push button has a retaining collar 41 (figure 8) which abuts

against the cover 40.

The cover 40 has an open lower end so as to allow a releasable lug 42 to enter therethrough to be latched on anchor lug 31.

- 5 The releasable lug 42 essentially comprises a simple cross bar over which the strap 43 of the safety belt is run, and two rivets 45 pivotally mounting two coupling fingers or tongs 44 at the ends of the bar. The coupling fingers 44 are resiliently urged towards each other to a closed position by two return torsion springs 46 which are mounted about the rivets 45 with their ends hooked respectively on the back of the cross bar 42 and the back of each of the coupling fingers 44. It will be noted (figure 8) that the locating sleeve 33 comprises a flange 47 adapted to retain the coupling fingers 44 towards the axis of the screw which flange extends outwardly enough to prevent the coupling fingers from escaping, with a truncated lower end for allowing the passage of push button 37.

Because of its simplicity the emergency release device according to this embodiment may be easily mounted even on safety belts already fitted on a vehicle. Indeed, it is simply necessary to fix the anchor lug 31 on the body of the vehicle with a screw 34, snap the cover 40 on and slide the cross bar 42 of the releasable lug through the strap 43 of the safety belt while spreading apart the two coupling fingers 44.

- 30 The releasable lug 42 is attached to the anchor lug 31 in the following manner. The two coupling fingers 44 are inserted under the cover 40 while held spread apart and the push button 37 is depressed until the push button and the locating sleeve 33 mounted on the screw 34 are located between the two coupling fingers. The coupling fingers 44 are then released and urged by their return springs 46 around the sleeve 33 mounted on the screw 34. When the releasable lug is pushed fully in the cover 40 the ends of the coupling fingers 44 amply extend above the screw thereby permitting the coupling fingers to cross behind the sleeve, the free ends of the coupling fingers being spaced from each other in two parallel vertical planes parallel to the plane of figure 7. To improve both the latching of the fingers as well as their coupling or engagement they are of S-shape with their upper ends curved to define an open jaw when they are crossed and with curved lower parts which embrace and contain the push button and the sleeve 33 fitted on the screw 34.

After the free ends of the coupling fingers are crossed behind, that is, above the sleeve 33 and the screw 34, the pressure on the push button 37 must merely be released for the movable latch member 35 to be pushed and slid towards the coupling fingers 44 and the latching bit 36 to be positioned between the free ends of the coupling fingers, inside the open jaw formed thereby, which precludes their movement away from each other and therefore the releasing of the cross bar 42 and the strap 43 which runs over the cross bar.

Conversely, to release the safety belt, one must merely depress the push button 37 which causes the movable latch member 35 to move rearwards with its latching bit 36 while compressing spring 38.

When the latching bit 36 is displaced behind the upper ends of the two coupling fingers at the limit of their paths of pivotal movement, the coupling fingers may spread apart and then permit the cross bar 42 to slide downwardly out with the attendant freeing of the strap 43.

- In a fifth alternative embodiment illustrated in figures 9 and 10, where the cover 40 has been removed, the emergency release device comprises an anchor lug 50 fixed by a screw 51 to the vehicle body 32 and a releasable lug comprising a cross bar 52 around which the safety belt strap 43 is looped. The cross bar 52 is provided with two coupling fingers 53 pivoted at the ends thereof by means of two rivets 54. The coupling fingers are of S-shape as illustrated in figures 7 and 8 and described hereinafter.

A sleeve 55 is received on screw 51 and serves both as a stop member for retaining the coupling fingers 53 which surround it when their free ends cross and as a spacer member between the head of screw 51 and the anchor lug for maintaining the anchor lug against the vehicle body. The large flange 64 on the sleeve 55 which will be noted serves to prevent the crossed fingers from slipping out along the axis of the screw 51. The flange 64 is chordally truncated at its lower side so as not to interfere with the swinging of the latch member 59.

- The anchor lug 50 carries on each side of a through hole for screw 51 a guide block or member 56 which serves to guide the coupling fingers 53 together and cross them round the sleeve 55 mounted on screw 51. In a blind bore or recess 57 formed in the lower end of the anchor lug 50 is located a compression spring 58 which serves to push the elongated latch member 59 provided with a push button 60 at its lower end and a latching bit 61 at its upper end. The latching bit is adapted to be introduced between the crossed ends of the coupling fingers 53 to prevent them from moving apart.

The latch member 59 is swingingly mounted round the hemi spherical head of screw 51 which is received in a depression 62 of complementary shape in the latch member 59. The latch member is held in place against the head of the screw by the cap or cover (not shown) which bears against the latch member 59 proximate to its pivotal axis and defines a gap on the back of the latch member 59 in order not to interfere with its rearward swinging and the attendant disengagement of the latching bit between the coupling fingers 53. It is to be noted that the push button 60 is located in alignment with the compression spring 58 and comprises a locating teat 63 passing through the latch member 59 and protruding from the other side thereof so as to be received axially inside the compression spring 58 and locate it.

- The operation of the above embodiment is very simple. When a force is exerted on the push button 60, the latch member 59 pivots about the hemi-spherical or round head of screw 51 and the latching bit 51 is retracted and frees the coupling fingers 53 the crossed ends of which may move away from each other; owing to the oblique traction force T exerted downwards by the strap 43, the releasable

lug escapes and frees the safety belt therewith.

Conversely, to fashion the safety belt, strap 43 of the selt belt is simply looped over the cross bar of the releasable lug and coupling fingers 53 are

- 5 inserted under the cap or cover (not shown) on each side of the spring 58 and the sleeve 55, then the coupling fingers are pushed upwards as far as possible while depressing the push button 60. The guide blocks or members 56 guide the free ends of the coupling fingers 53 which cross behind the sleeve 55, and by releasing the pressure on the push button 60, the push button is returned to its rest position by return spring 58, the latch member 59 swings around the hemispherical or round head of screw 51 and latching bit 61 is engaged between the crossed upper ends of the coupling fingers 53 thereby latching the device.

- The sixth alternative embodiment illustrated in figures 11 and 12 comprises, like the above described embodiments, an anchor lug 70 fixed on body 32 of a vehicle by a screw 71 and a releasable lug comprising a cross bar 72 around which is run the strap 43 of the safety belt. Two coupling fingers 73 are pivoted at the ends of the cross bar 72 by means of rivets 74, and a sleeve 75 with a large retaining flange 89 received on a screw 71 serves as an abutment member about which the coupling fingers 73 are adapted to close again, with their ends crossing each other. The anchor lug 70 comprises two guide blocks or members 76 fixed symmetrically relative to the centre line passing along the through hole for the screw 71, which guide blocks or members serve to close the coupling fingers 73 about the sleeve 75 when the releasable lug inserts them under the cover 77.

- The latching of the coupling fingers is accomplished as above by introducing a latching bit 78 between their crossed ends, the latching bit being fixed at the upper end of a latch member 79 slidably mounted along the anchor lug 70 and guided for displacement by two lateral guide pins 80 and by the locating sleeve 75 which traverses the latch member 79 through a vertical opening 81. At the lower end of the latch member 79 and at the limit of the opening 81 is fixed a ramp 82 which sloped downwards towards the vehicle body 32.

- Between the ramp 82 and the locating sleeve 75 is interposed a compression spring 83 accommodated in the opening 81 and retained by two vertical coats 84 and 85 aligned in continuation of each other and embedded respectively in the sleeve 75 and the ramp 82. Spring 83 serves to push the latch member 79 downwards and maintains the latching bit 78 engaged between the ends of the coupling fingers 73. Facing the ramp 82 is arranged a push button 86 extending through an aperture in cover 77. The push button 86 is retained by the cover 77 by means of an abutment flange 87 and it comprises a ramp 88 formed at its inner end with respect to the cover. The slope of the ramp 88 is the same as that of ramp 82 on the latch member 79, and the two are maintained in constant contact therewith by the spring 83 which urges the ramp 82 downwards.

- This embodiment operates in the following manner. The strap 43 of the safety belt being looped

- round cross bar 72 and the coupling fingers 73 being introduced under the cover 77 by pushing the same upwards, the two guide blocks or members 76 close the coupling fingers 73 around the sleeve 75. If the operator has taken care to press the push button 86 simultaneously therewith, which causes the ramp 82 to rise, the associated latch member 79 and the latching bit 78 integral therewith the ends of the fingers 73 may cross each other behind the sleeve 75 as they encounter no obstacles. By releasing the pressure on the push button 86, spring 83 urges the latch member 79 downwards thereby causing the latching bit 78 to be engaged between the crossed ends of the coupling fingers 73 and latch the device. Conversely, pressure exerted on push button 86 causes the ramp 82 to rise along the ramp 88 on the push button and lift the latch member 79 and its latching bit 78 which is disengaged from between the ends of the fingers 73 which urged downwards by the traction force of the strap 43 more apart and free the cross bar 72 and with it the associated strap of the safety belt.

- It is understood that modifications and variations may be resorted to without departing from the scope of the invention as defined by the appended claims.

CLAIMS

1. An emergency release device for a strap of a safety belt, comprising an anchor lug adapted to be fixed to a vehicle, a releasable lug adapted to be attached to the strap, means for latching the said lugs together by engagement of portions of mating configuration, resilient means urging the said portions of mating configuration into mating engagement, and a release member for releasing the said releasable lug carried by the said anchor lug and resiliently urged to a rest position.
2. A device as claimed in claim 1, in which a first portion of mating configuration comprises a projecting portion carried by the said releasable lug and a second portion of mating configuration comprises a hollow portion in the said anchor lug.
3. A device as claimed in claim 2, in which the said projecting portion comprises a latching pin and the said hollow portion comprises a hole through the said anchor lug for accommodating the said latching pin.
4. A device as claimed in any of claims 1 to 3, in which the said release member comprises a push button slidably mounted for displacement through the said anchor lug for pushing the said releasable lug against the action of the said resilient means in order to disengage the said portions of mating configuration.
5. A device as claim in any of claims 1 to 4, in which the said resilient means is a leaf spring member comprising at least one bent-over tab for urging the said releasable lug against the said anchor lug and a tab for resiliently bearing against an upper end of the said releasable lug so as to expel it when the said portions of mating configuration are disengaged by the action of the said release member.
6. A device as claimed in any of claims 1 to 4, in

which an abutment is provided behind an upper end of the said releasable lug so as to limit the swinging of the said releasable lug due to an oblique traction force of the strap of the safety belt.

5 7. A device as claimed in claim 6, in which the said abutment essentially comprises a downwardly bent-over tongue formed from a strike in the said anchor lug.

8. A device as claimed in claim 6, in which the
10 said abutment essentially comprises a rear edge of a cutout in the said anchor lug in which an upper end of the said releasable lug is engaged.

9. A device as claimed in claim 1, in which the said latching means comprises a stop member
15 protruding from one of the said lugs, two coupling fingers pivoted on the other said lug so that their ends may cross each other and secure the strap relative to the said stop member by embracing it, and a latching member insertable between the ends
20 of the said coupling fingers when they are crossed.

10. A device as claimed in claim 9, in which the said stop member comprises a fixed pin protruding from the said anchor lug and the said coupling fingers being pivoted on the said releasable lug
25 along which the strap is adapted to slide.

11. A device as claimed in claim 9 or 10, in which the said latching member is a latching bit integrally formed with a movable member resiliently urged in a direction of engagement of the said latching bit
30 between the crossed ends of the said coupling fingers.

12. A device as claimed in claim 11, in which the said movable member carrying the said latching bit is slidably mounted on the said stop member.

35 13. A device as claimed in claim 11, in which the said movable member carrying the said latching bit is mounted for swinging movement about a pivot point fixed relative to the said anchor lug.

14. A device as claimed in claim 11, in which the
40 said movable member carrying the said latching bit is slidably mounted along the said anchor lug.

15. A device as claimed in any of claims 9 to 14, comprising guide members associated with the said lug carrying the said stop member, which guide
45 members ensure the movement of the said coupling fingers around the said stop member towards each other.

16. A device as claimed in any of claims 9 to 14, comprising resilient means urging the ends of the
50 said coupling fingers into their crossed position.

17. A safety belt having an emergency release device as claimed in any of the preceding claims.

18. An emergency release device substantially as herein described with reference to or as illustrated in
55 figures 1 and 2, or figures 3 and 4, or figure 5, or figure 6, or figures 7 and 8, or figures 9 and 10, or figures 11 and 12.